Notes on the Natural History of the Terrestrial Leech, *Haemopis septagon* Sawyer and Shelley (Gnathobdella: Hirudinidae)

ROWLAND M. SHELLEY AND ALVIN L. BRASWELL
North Carolina State Museum of Natural History, P.O. Box 27647, Raleigh, North Carolina 27611
and
DAVID L. STEPHAN
Department of Entomology, North Carolina State University, Raleigh, North Carolina 27607

ABSTRACT.—The terrestrial leech, *Haemopis septagon* Sawyer and Shelley, inhabits moist floodplains near water sources in North Carolina and appears to be widespread in the Coastal Plain and eastern Piedmont of the state. Large earthworms seem to be the primary food source. Some individuals display light yellowish stripes along the lateral margin, and one reddish juvenile has been collected, possibly reflecting a recessive genotype for color. Immature specimens have been encountered in April and are characterized by a flattened female gonopore and reduced body size. Anatomical, ecological, and geographical similarities with *H. terrestris* (Forbes) suggest a close phylogenetic relationship for the two land leeches of North America.

The terrestrial leech, *Haemopis septagon* Sawyer and Shelley, inhabits the Coastal Plain and eastern Piedmont Plateau provinces of the Carolinas and Virginia (Sawyer and Shelley 1976). The only other land leech in the United States, *Haemopis terrestris* (Forbes), occurs in the Mississippi and Ohio River valleys from the southern Great Lakes south to Louisiana and eastward along the Gulf Coast to Gainesville, Florida (Sawyer 1972, Sawyer and Shelley 1976). The latter species occurs in damp soil under rocks and logs and feeds on large earthworms (Forbes 1890, Sawyer 1972). Little is known about its life history. Sawyer and Shelley (1976) described the anatomy of *H. septagon*, but because the number of specimens was limited, and most were preserved without habitat data, no ecological or reproductive information was provided.

In the past few years we have collected a number of specimens of *H. septagon* in North Carolina, especially from the upper Neuse River Basin of Wake County, and present the following observations on its habitat, life history, and color variation to supplement the popularized account by Shelley (1977). Six individuals were immature, as revealed by overall size and the condition of the female gonopore.

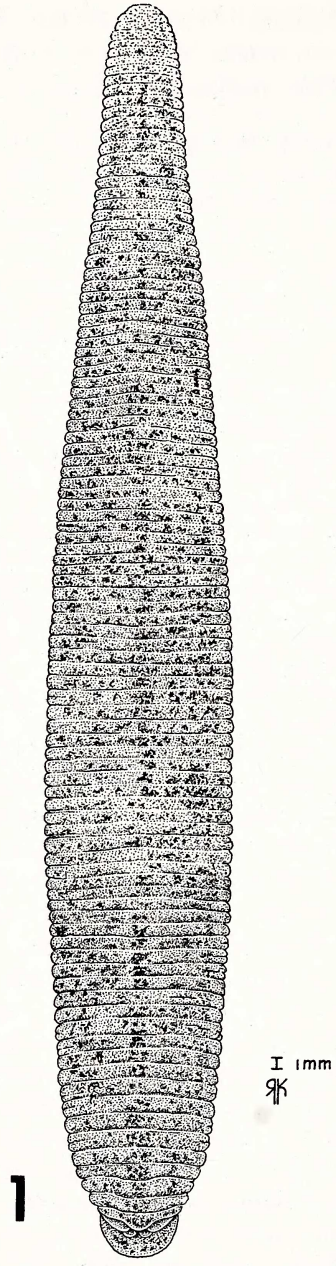

Fig. 1. Dorsal view of adult *Haemopis septagon,* specimen from 0.5 km nw Falls, Wake Co., North Carolina.

As described by Sawyer and Shelley (1976), the dorsal pigment pattern of *H. septagon* (Fig. 1) is typically dark olive-green with a faint, longitudinal middorsal stripe and numerous scattered black flecks; the venter is lighter olive-green without flecks. Variation in this pattern has been noted among the individuals reported below. Juveniles and some adults also display yellowish marginal stripes, which are most conspicuous on the leech from Duplin County (NCSM P177) (see locality data below). Here the pattern resembles that exhibited by *H. terrestris* (Sawyer 1972, Fig. 13F). A reddish immature leech was collected in a sample containing five additional fully pigmented juveniles of the same size and, presumably, the same age. This individual is uniformly red on both surfaces, possibly because of blood in the underlying musculature, and the eyes, middorsal stripe, and flecks are faintly visible. Its color is similar to that of an albino specimen of *Dina absoloni* Johansson (Erpobdellidae) from a cave in Yugoslavia (Johansson 1913). Other reports of albino leeches are of white specimens, however, and include an unidentified species of *Philaemon* (Haemadipsidae) from a cave in New Guinea (Ewers 1974), and *Erpobdella punctata punctata* (Leidy) (Erpobdellidae) from a lake in southern Michigan (Sawyer 1970). It is noteworthy that the juvenile *H. septagon* was collected with five fully pigmented juveniles of apparently the same age. Thus, its reduced pigmentation may be reflective of a recessive genotype for color.

The six juveniles mentioned above and two adults were collected on 19 April 1976 in northern Wake County. The immatures were generally smaller than the adults in physical dimensions, and the female gonopore was flattened and contiguous with the ventral surface instead of elevated and nipple-shaped. The gonopores conformed to the species description in location, the male being 24 annuli posterior to the oral sucker and 6½-7 annuli anterior to the female opening. Elevation of the female gonopore is apparently achieved later in development and is not characteristic of young individuals.

The habitat of *H. septagon* is similar to that mentioned earlier for *H. terrestris*. The leech is usually encountered on moist floodplains in deciduous forests; the areas immediately surrounding floodplain ponds and backwaters of rivers and creeks seem to be preferred. Most individuals are found under or inside partially buried, rotting logs, and some have been taken from wet leaf litter. Several specimens were collected from seepage areas on hardwood slopes. All of the leeches have been found close to but not in standing water, in areas also inhabited by large earthworms. During preservation some specimens regurgitated portions of earthworms, which appear to be their primary food.

The following new localities, all in North Carolina, are reported for *H.*

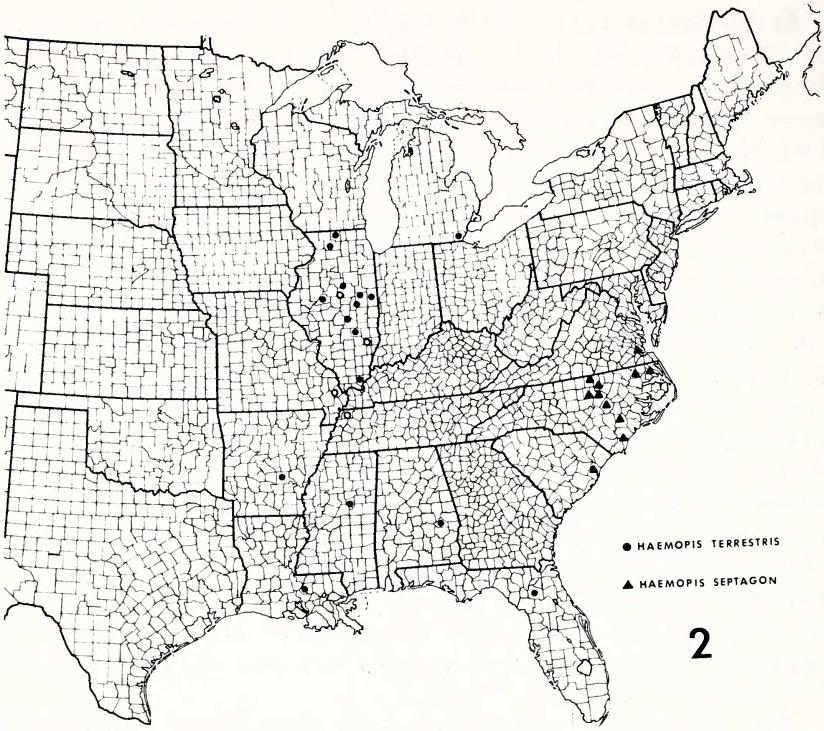

Fig. 2. Distribution of the terrestrial leeches of the United States, taken in part from Sawyer (1972) and Sawyer and Shelley (1976). Each circle represents a single collecting locality except for those sites occurring close together, which are represented by one symbol. Open circles are based on literature records believed to be valid.

septagon; coupled with those listed by Sawyer and Shelley (1976) they indicate that the species is widespread in the Coastal Plain of the state. The leech is common at the type locality in spring and summer. All specimens referred to are deposited in the invertebrate collections of the North Carolina State Museum of Natural History (NCSM).

Person Co.—12.8 km ne Roxboro, off co. rd. 1518 near Mayo Cr. (Roanoke dr.), 1 adult, 5 April 1977, A.L. Braswell (NCSM P223). *Granville Co.*—4.8 km se Creedmoor, along co. rd. 1721, 1.9 km e jct. co. rd. 1722, under log near trib. Robertson Cr. (Neuse dr.), 1 adult, 27 April 1977, J.E. Cooper and R.E. Ashton (NCSM P227). *Durham Co.*—9.9 km sw Durham, along NC hwy 54, 0.2 km e jct. NC hwy. 751, floodplain Third Fork Cr. (Cape Fear dr.), 1 adult, 11 July 1975, R.M. Shelley and J.C. Clamp (NCSM P126). This site is about 1.6 km e of the type locality. *Wake Co.* (all Neuse dr.)—along co. rd. 1918, 0.3 km se jct. co. rd. 1909,

under log in seepage area near small trib. Newlight Cr., 1 adult, 18 February 1976, A.L. Braswell and N. Murdock (NCSM P175); 5.6 km n Cary, along US hwy I-40, 0.5 km nw jct. co. rd. 1795, floodplain Crabtree Cr., 2 adults, 28 March 1976, A.L. Braswell and N. Murdock (NCSM P178); near Neuse R. at NC hwy. 98, 1 adult, 19 April 1976, A.L. Braswell and D.L. Stephan (NCSM P181); 0.5 km nw Falls, under wet leaves in seepage area, about 15 cm from water and 46 m from Neuse R., 1 adult, 18 February 1976, A.L. Braswell and N. Murdock (NCSM P176); 7.7 km sw Wake Forest, along co. rd. 2000 near Neuse R., 2 adults, 6 immatures (one reddish in color), 19 April 1976, A.L. Braswell and D.L. Stephan (NCSM P180). *Johnson Co.*—Smithfield, in lawn or plant bed at 831 Ward St. (Neuse dr.), 1 adult, 10 April 1977, M. Dublin (NCSM P224). *Duplin Co.*—13.6 km ne Kenansville, Goshen Swamp (Cape Fear dr.) near NC hwy. 11, 1 adult, 6 March 1976, B.S. Martof and J.H. Reynolds (NCSM P177). *Pasquotank Co.*—Elizabeth City, crawling on ground near service station (Pasquotank dr.), 1 adult, 8 March 1975, R. Mann (NCSM P186).

The similarities between *H. septagon* and *H. terrestris* are noteworthy. In addition to terrestrial habits they have comparable color patterns, with a dark base color and darker middorsal and lighter lateral stripes. These markings are better defined in *H. terrestris* than in *H. septagon*. External differences include the configuration of the adult female gonopore (elevated in *H. septagon,* flattened in *H. terrestris*) and the annular separation of the gonopores (6½-7 annuli in *H. septagon,* 5-5½ annuli in *H. terrestris*). The Carolina species seems to be more dependent upon moisture and is rarely found more than a few meters from a water source. According to Sawyer (1972), *H. terrestris* is usually found "well away from the water" and thus seems to be better adapted to terrestrial life. Anatomical, ecological, and geographical (Fig. 2) comparisons suggest that the two may be sister species only one step removed from a common ancestor. Conceivably, either could have been the stock from which the other was derived, existing relatively unchanged since the time of divergence. They may prove to occur sympatrically in Georgia and southern South Carolina, and future efforts should be directed toward determining the nature of the terrestrial leech populations of these areas.

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